

Galaxy CO₂ Incubator Model No: 170-001

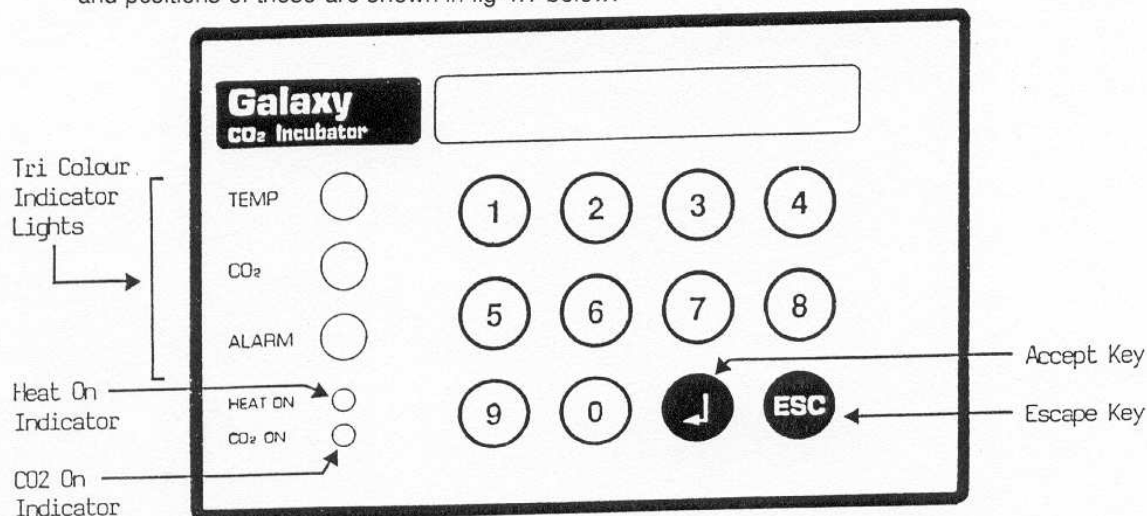
User Manual Extracts

Section 4

Operating Instructions

4.1 Control Panel Description

The control panel consists of an LCD display, 12 soft keys and five indicator lights. The functions and positions of these are shown in fig 4.1 below:-



The general principles of operation and display of the control panel are as follows:-

1) The LCD display is divided into two command lines as shown in fig 4.2 below.



- The upper line displays information relating to the current condition of the incubator.
 - The lower line indicates a choice of available options. Individual options are selected by pressing the corresponding soft key (nos 1-4) directly below them.
- The \downarrow accept key enters new programmed values into the control system.
 - The esc (escape) key returns the display to the previous screen.
 - The three large tricolour indicators display the current status of temperature, CO₂ and the alarm system.
 - The two smaller indicator lights are illuminated when either the heating elements are switched on or the CO₂ valve is open.

4.2 Understanding the Chamber Condition Warning Lights

During normal operation the three large status lights will be either green or orange. Should an abnormal (alarm) condition occur the relevant status light will change to red. The significance of the warning lights is described below:-

GREEN

A green temperature or CO₂ status light indicates that the incubator is operating within specification ($\pm 0.1^{\circ}\text{C}$ or $\pm 0.1^{\circ}\text{CO}_2$).

A green alarm status light indicates that the alarms are set to monitor the chamber conditions.

ORANGE

An orange temperature or CO₂ status light indicates that the incubator is operating outside specification but within alarm settings ($\pm 0.5^{\circ}\text{C}$ or $\pm 0.5^{\circ}\text{CO}_2$).

An orange alarm status light indicates that the temperature and CO₂ alarms are inhibited for a timed period (see Section 4.3.3.).

RED

Any red light on the control panel indicates an alarm condition is occurring or has occurred. The possible conditions are:-

- 1) A red temperature or CO₂ status light accompanied by an audible buzzer indicates that the incubator is currently running in an alarm condition.
- 2) A red temperature or CO₂ status light with **NO** audible buzzer indicates an alarm condition has occurred and been corrected by the incubator with no user action (ie since the keypad was last used.) (see Section 4.3.2. + 4.12).
- 3) A red alarm status light accompanied by an audible buzzer indicates one of the following has occurred (a relevant message will also appear on the LCD Display):-
 - a) The inner chamber door has been left open for longer than 45 seconds.
 - b) The independent overtemperature cut out has been activated (see Section 4.14 for further details).

4.3 Alarms Inhibited and Alarm Conditions

4.3.1 If the incubator is in an alarm condition then pressing any soft key will cancel the red light, buzzer and alarm message. The alarms will then be inhibited for fifteen minutes to allow the condition to be investigated.

4.3.2 If the incubator has logged an alarm condition whilst unattended the red light and alarm message can be cancelled by pressing any soft key.

4.3.3 The temperature and CO₂ alarms are inhibited when the large tricolour alarm light is orange. Under the following circumstances the alarms are inhibited for a period of fifteen minutes to allow the chamber to return to set point conditions:-

- 1) After a door opening (the fifteen minutes commence once the inner door is closed).
- 2) A previous alarm condition has been cancelled.

* If both CO₂ and temperature set points are achieved in less than fifteen minutes and maintained for at least one minute then the timeout is overruled and the alarms are reset immediately.

At the end of fifteen minutes the alarms are automatically reset independent of chamber conditions.

If at this time an alarm condition still persists the unit will immediately register this and revert to alarm condition.

NOTE: All the above information is automatically logged in the microprocessor memory and can be accessed via the datalogging function - see Section 4.12.

4.5 Programming of Set Points

This function allows programming of the set points (temperature, CO₂ and alarms). The acceptable ranges for temperature and CO₂ are as follows:-

Temperature:- 10.0°C - 50.0°C (must be 3.0°C above ambient).

CO₂:- 0.0% - 9.9%

The programming function is accessed from the main screen display (as shown in fig 4.2) by using the following sequence:-

4.5.1

TEMP XX.X°C		CO ₂ X.X%	
PROG	TIMER	UTILS	DATA

Press prog (programme) - soft key 1. If an access code is not programmed proceed to 4.5.3 (see Section 4.4 on how to enter an access code). If an access code is programmed the following display will appear:-

4.5.2

ENTER ACCESS CODE
XXXX

Enter 4 digit access code and press accept key ↵

4.5.3

CHAMBER SET PT	XX.X	X.X
ALARM	TEMP	CO ₂

To programme new values for temperature for CO₂ press the corresponding soft key 3 or 4. A cursor will appear in the relevant position and allow a new value to be entered using the numerical keys. When the desired value has been keyed in press the accept key ↵ to transfer data to the microprocessor memory.

4.5.4

When a new set point value is programmed the alarms will automatically be set at $\pm 0.5^{\circ}\text{C}$ and $\pm 0.5\%$ CO_2 .

Should it be necessary to set the alarms independently this can be achieved by pressing alarm - soft key 1 (section 4.5.3) The following display will appear:-

XX.X	XX.X	X.X	X.X
HI	TEMP	LO	HI CO ₂ LO

The high (hi) or low (lo) value for temperature and CO_2 can be accessed by pressing the corresponding soft key.

A cursor will appear in the relevant position and a new value can be entered using the numerical keys.

When the desired value has been entered press the accept key \rightarrow to transfer data to the microprocessor. Press the escape key to return to the main screen.

NOTE: *Factory default settings are 37.0°C and 5.0% CO_2 .*

4.7 Setting the Clock

The incubator has a built in 24 hour clock and date function. This section describes how to set the clock. (Please note that the clock is set to the current time and date prior to despatch). The function is accessed from the main screen display (as shown in fig 4.2) by using the following sequence:-

4.7.1

TEMP XX.X°C	CO ₂ X.X%		
PROG	TIMER	UTILS	DATA

Press utils (utilities) - soft key 3

4.7.2

UTILITIES MODE			
CLOCK	DIAG	A/Z	USER

Press clock - soft key 1

4.7.3

CLOCK UTILITIES			
DISP	SET	TIMER	CONT

- a) To display the current set time press disp - soft key 1.
- b) To access the timer function press timer - soft key 3.
- c) To display the clock continuously press cont - soft key 4. (see Section 4.8).
- d) To set the current time press set - soft key 2 and the following will be displayed:-

4.7.4

DATE	MONTH	YEAR
TIME		

Use the escape key (esc) to move the cursor to the desired position and then enter the relevant data using the numerical keys. Once the date for one parameter has been entered the cursor will automatically move to the next position. When the required values have been entered press the accept key to set the clock. **NOTE:** When setting the month, programme in the number of the month (Jan.=01, Feb.=02 etc). When accepted the display will automatically show the month name.

4.9 CO₂ Auto-Zeroing

This function of the software allows semi-automatic zeroing of the CO₂ system. It is recommended that this procedure is carried out monthly (or if the CO₂ level is suspect). The function is accessed from the main screen display (as shown in fig 4.2) by using the following sequence:-

4.9.1

TEMP XX.X °C	CO ₂ X.X%		
PROG	TIMER	UTILS	DATA

Press utils (utilities) - soft key 3

4.9.2

*** UTILITIES MODE ***			
CLOCK	DIAG	A/Z	USER

Press A/Z - soft key 3.

4.9.3

AUTO-ZEROING
OPEN INNER DOOR

The inner door should be opened and the following display will appear:-

4.9.4

TEMP XX.X °C	CO ₂ X.X %
DEGAS TIMEOUT	XX (SECS)

A 60 second count down commences to allow the chamber to be completely emptied of CO₂. This is followed by the display:-

4.9.5

CHAMBER DEGASSED
CLOSE INNER DOOR

The inner door should then be closed and the following display will appear:-

4.9.6

TEMP XX.X°C CO₂ X.X%
AUTOZERO TIMEOUT XX.XX

A 10 minute countdown now commences. This is to allow the chamber conditions to stabilize with no CO₂ in the chamber so that automatic zero adjustment can take place. After the 10 minutes the screen will display the following:-

4.9.7

CO₂ ZERO LEVEL = X.XX%
GAIN XXX

If an adjustment is required the control system performs this automatically. This may take 2/3 minutes with the system making an adjustment, assessing the condition and either accepting the corrected level or making a further adjustment. The level for the CO₂ zero setting is between 0.0% and 0.1%.

4.9.8

When the zeroing process is complete the display will return to the main screen, the CO₂ valve is switched on and the alarms are inhibited for fifteen minutes or until set points are achieved (whichever occurs first).

NOTE: If during an autozero the above sequence is not followed or any keypad button is pressed the autozero will be abandoned and the previous gain value will be used.

4.13 Diagnostics

This section allows access to a number of simple diagnostic functions. In the event of a fault this may enable telephone diagnosis by RS Biotech and also allows service personnel to be fully prepared. The function is accessed from the main screen display (as shown in fig 4.2) by using the following sequence:-

4.13.1

TEMP XX.X °C	CO ₂ X.X%		
PROG	TIMER	UTILS	DATA

Press utils (utilities) - soft key 3.

4.13.2

*** UTILITIES MODE ***			
CLOCK	DIAG	A/Z	USER

Press diag (diagnostics) - soft key 2.

4.13.3

*** DIAGNOSTICS MODE ***			
DISP	CO ₂	ENG	TYPE

- a) Type - soft key 4 shows the version of software.
- b) Eng - soft key 3 is an engineering function and is only accessed by RSB service personnel (a special access code is required).
- c) CO₂ - soft key 2 allows manual adjustment of the CO₂ zero - see Section 7.3
- d) Disp - soft key 1 displays detailed information regarding the status of the incubator as follows:-

4.13.4

*** DISPLAY MODE ***			
TEMP	CO ₂	A/Z	POWER

- a) CO₂ - soft key 2 displays the current CO₂ content within the chamber (to 2 decimal places).
- b) A/Z - soft key 3 displays the last time that a CO₂ autozero was performed.
- c) Power - soft key 4 displays the last time the power was switched on.
- d) Temp - soft key 1 displays the following:-

*** DISPLAY MODE ***		
CHMB	ELMT	DOOR

4.13.5

- a) Chmb - soft key 1 displays the current chamber temperature.
- b) Elmt - soft key 2 displays the current element temperature. This should read between 36.0°C and 42.0°C when the chamber is running at 37.0°C.
- c) Door - soft key 3 displays the current door element temperatures.

Door 1 sensor is connected to the outer door heating element and should read between 36.0°C and 42.0°C when the chamber is running at 37.0°C.

Door 2 sensor is connected to the internal metal surface of the door and is controlled at the same temperature as the chamber.

NOTE: Should the display in a), b) or c) read > 80.0°C this indicates an open circuit in the sensor.

Should the display in a), b) or c) read < 10.0°C this indicates a short circuit in the sensor.